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ETISO3 9644SUS

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in a network containing multiple boot servers
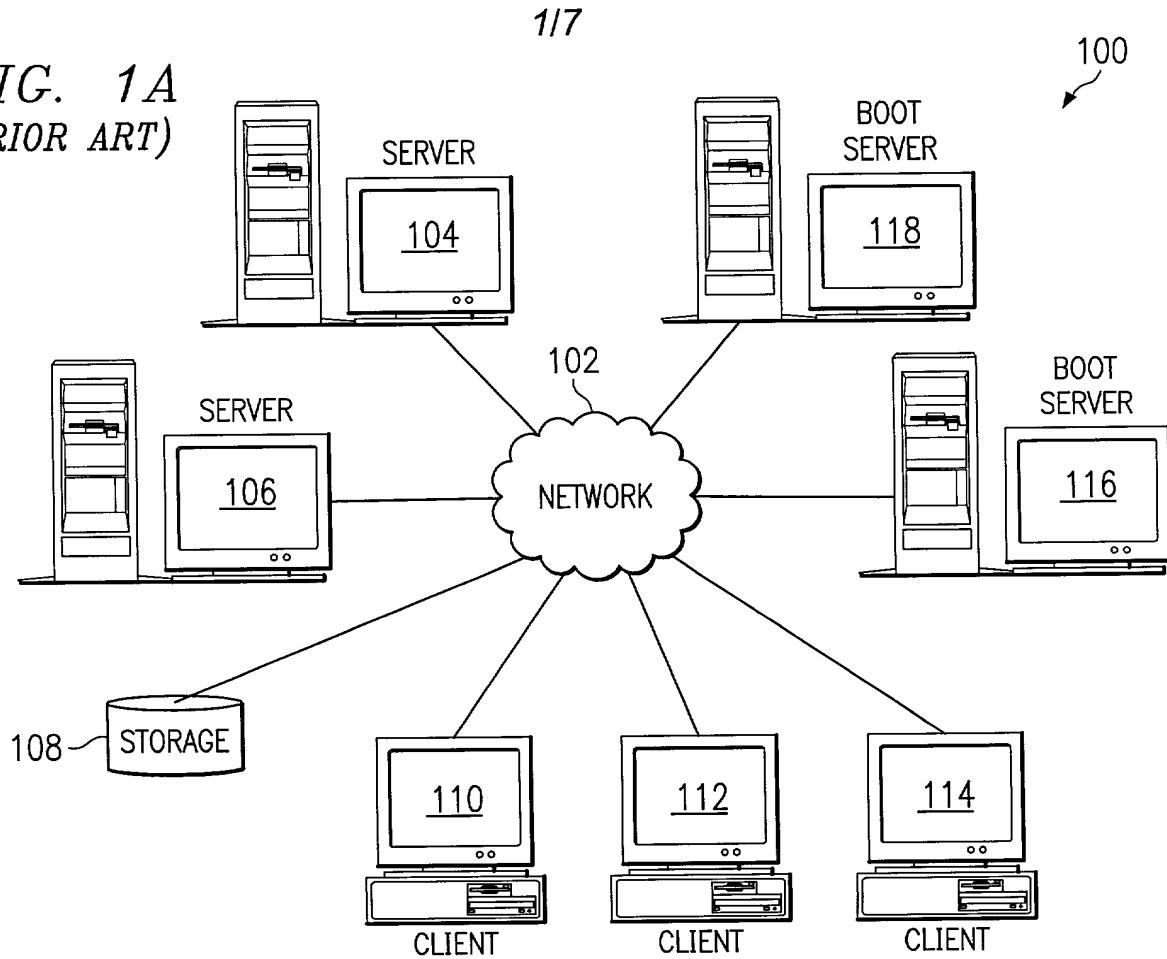
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FIG. 1A
(PRIOR ART)

100

SERVER
104

BOOT SERVER
118

102

SERVER
106

NETWORK

BOOT SERVER
116

108 — STORAGE

CLIENT
110

CLIENT
112

CLIENT
114

FIG. 1B
(PRIOR ART)

120

146

144

122

CPU

DISPLAY ADAPTER

DISPLAY

PRINTER
130

124 — RAM

126 — ROM

128 — I/O ADAPTER

USER INTERFACE ADAPTER

148

123

142
MOUSE

DISK

132

136

COMMUNICATION ADAPTER
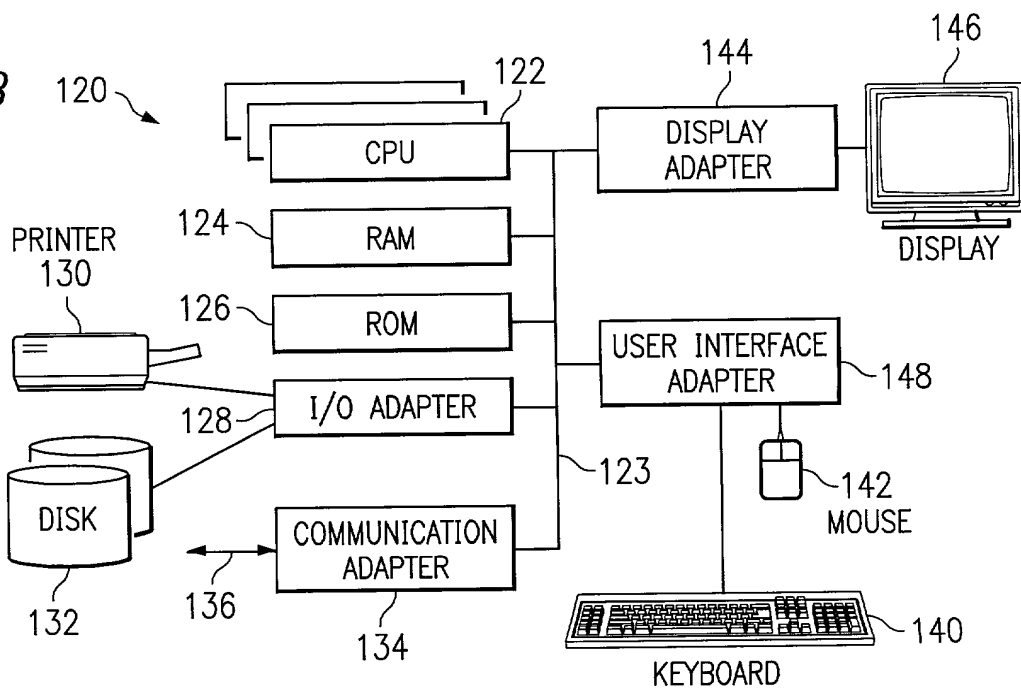
134

140

KEYBOARD

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FIG. 2A
(PRIOR ART)

200

PXE	206

BIOS	NETWORK INTERFACE HARDWARE

204

202

FIG. 2B
(PRIOR ART)

PXE CLIENT

DHCP DISCOVER TO PORT 67 CONTAINS "PXEClient" EXTENSION TAGS — STEP 210

PXE CLIENT

EXTENDED DHCP OFFER TO PORT 68 CONTAINS: PXE SERVER EXTENSION TAGS + [OTHER DHCP OPTION TAGS] + CLIENT IP ADDR — STEP 212

DHCP/PROXY DHCP SERVICE

DHCP/PROXY DHCP SERVER

DHCP REQUEST TO INSTALLATION SERVER PORT 67 CONTAINS "PXEClient" EXTENSION TAGS + [OTHER DHCP OPTION TAGS] — STEP 214

DHCP/PROXY DHCP SERVICE

PXE CLIENT

DHCP ACK REPLY TO PORT 68 — STEP 216

PXE CLIENT

BOOT SERVICE DISCOVER TO PORT 67 OR 4011 CONTAINS: "PXEClient" EXTENSION TAGS + [OTHER DHCP OPTION TAGS] — STEP 218

BOOT SERVICE

BOOT SERVICE ACK REPLY TO CLIENT SOURCE PORT CONTAINS: [PXE SERVER EXTENSION TAGS] (CONTAINS NETWORK BOOTSTRAP PROGRAM FILE NAME) — STEP 220

BOOT SERVER

PXE CLIENT

EXECUTE DOWNLOAD BOOT IMAGE

STEP 226

NETWORK BOOTSTRAP PROGRAM DOWNLOAD REQUEST TO TFTP PORT 69 OR MTFTP PORT (FROM BOOT SERVICE ACK) — STEP 222

M/TFTP SERVICE

PXE CLIENT

NETWORK BOOTSTRAP PROGRAM DOWNLOAD TO CLIENT'S PORT — STEP 224

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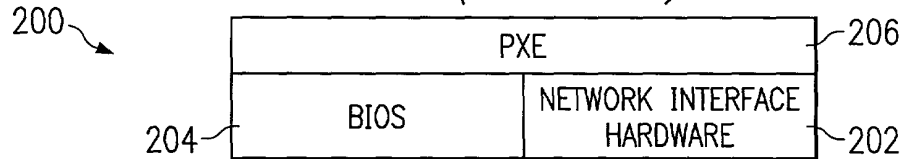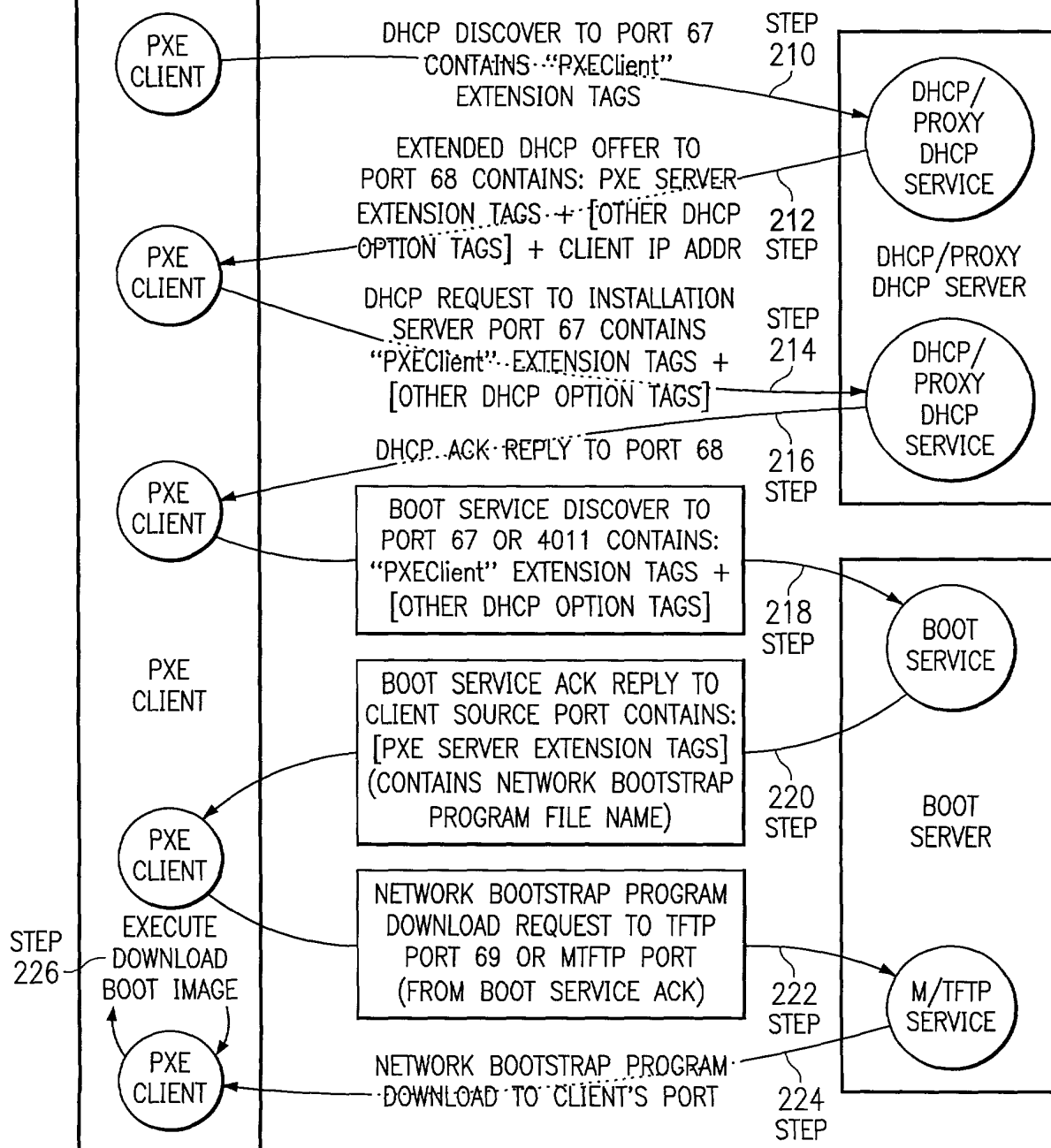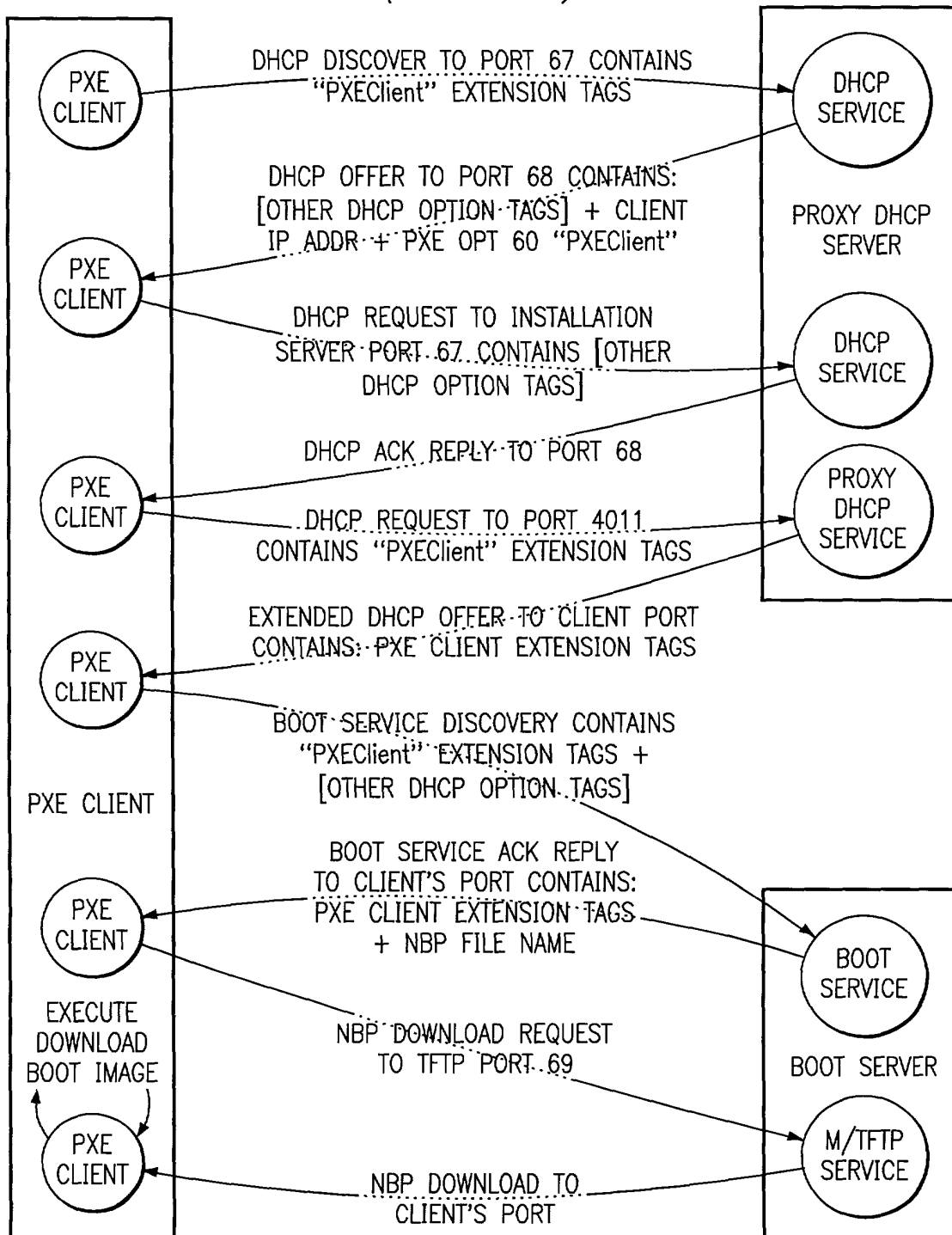
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FIG. 2C
(PRIOR ART)

PXE CLIENT

PXE CLIENT

DHCP DISCOVER TO PORT 67 CONTAINS
"PXEClient" EXTENSION TAGS

DHCP OFFER TO PORT 68 CONTAINS:
[OTHER DHCP OPTION TAGS] + CLIENT
IP ADDR + PXE OPT 60 "PXEClient"

DHCP REQUEST TO INSTALLATION
SERVER PORT 67 CONTAINS [OTHER
DHCP OPTION TAGS]

DHCP ACK REPLY TO PORT 68

DHCP REQUEST TO PORT 4011
CONTAINS "PXEClient" EXTENSION TAGS

EXTENDED DHCP OFFER TO CLIENT PORT
CONTAINS: PXE CLIENT EXTENSION TAGS

BOOT SERVICE DISCOVERY CONTAINS
"PXEClient" EXTENSION TAGS +
[OTHER DHCP OPTION TAGS]

BOOT SERVICE ACK REPLY
TO CLIENT'S PORT CONTAINS:
PXE CLIENT EXTENSION TAGS
+ NBP FILE NAME

EXECUTE
DOWNLOAD
BOOT IMAGE

NBP DOWNLOAD REQUEST
TO TFTP PORT 69

NBP DOWNLOAD TO
CLIENT'S PORT

DHCP
SERVICE

PROXY DHCP
SERVER

DHCP
SERVICE

PROXY
DHCP
SERVICE

BOOT
SERVICE
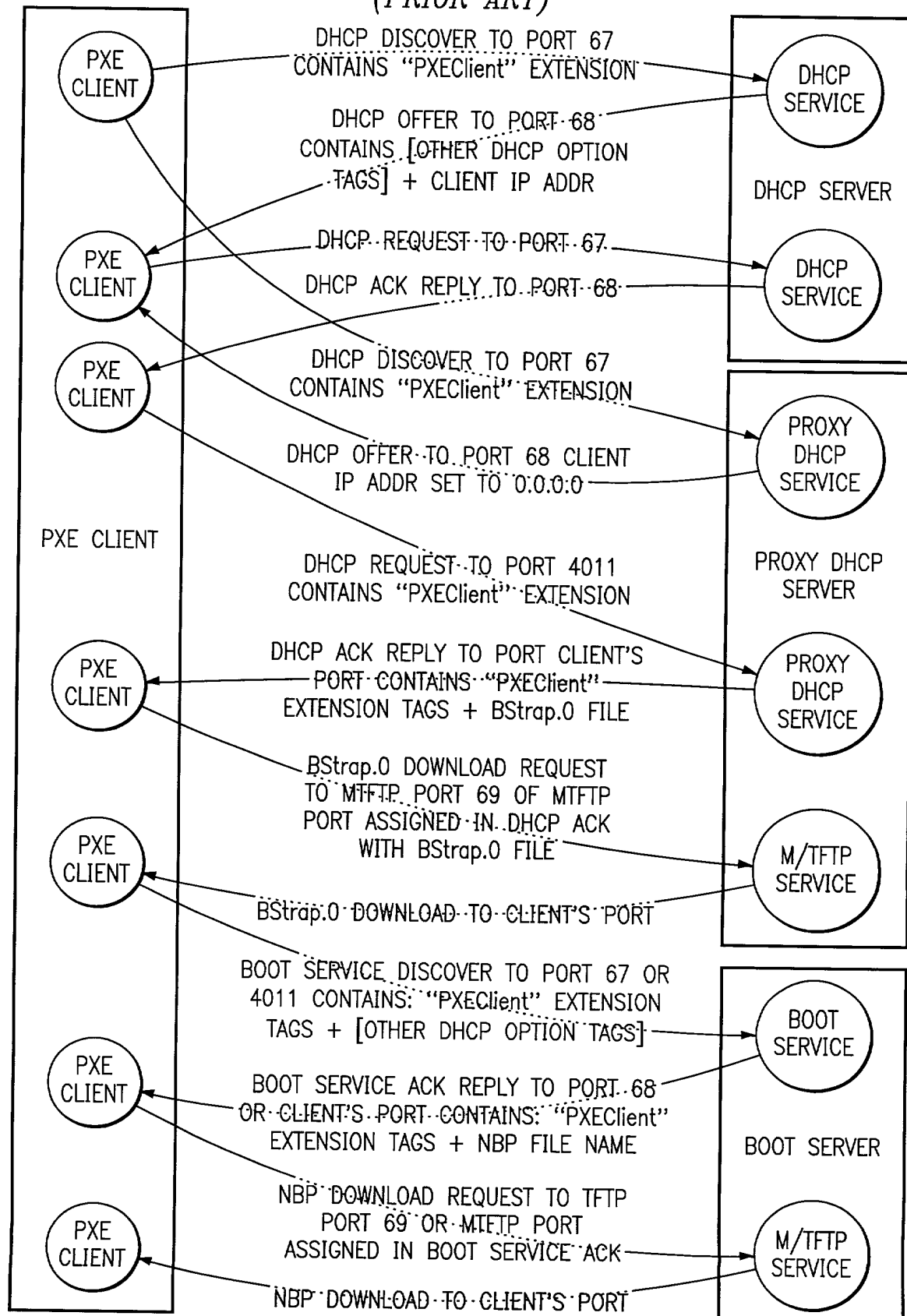
BOOT SERVER

M/TFTP
SERVICE

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FIG. 2D
(PRIOR ART)

PXE CLIENT

DHCP DISCOVER TO PORT 67
CONTAINS "PXEClient" EXTENSION

DHCP SERVICE

DHCP OFFER TO PORT 68
CONTAINS [OTHER DHCP OPTION
TAGS] + CLIENT IP ADDR

DHCP SERVER

DHCP REQUEST TO PORT 67

DHCP ACK REPLY TO PORT 68

DHCP SERVICE

DHCP DISCOVER TO PORT 67
CONTAINS "PXEClient" EXTENSION

PROXY DHCP SERVICE

DHCP OFFER TO PORT 68 CLIENT
IP ADDR SET TO 0.0.0.0

PROXY DHCP SERVER

DHCP REQUEST TO PORT 4011
CONTAINS "PXEClient" EXTENSION

DHCP ACK REPLY TO PORT CLIENT'S
PORT CONTAINS "PXEClient"
EXTENSION TAGS + BStrap.0 FILE

PROXY DHCP SERVICE

BStrap.0 DOWNLOAD REQUEST
TO MTFTP PORT 69 OF MTFTP
PORT ASSIGNED IN DHCP ACK
WITH BStrap.0 FILE

BStrap.0 DOWNLOAD TO CLIENT'S PORT

M/TFTP SERVICE

BOOT SERVICE DISCOVER TO PORT 67 OR
4011 CONTAINS "PXEClient" EXTENSION
TAGS + [OTHER DHCP OPTION TAGS]

BOOT SERVICE

BOOT SERVICE ACK REPLY TO PORT 68
OR CLIENT'S PORT CONTAINS "PXEClient"
EXTENSION TAGS + NBP FILE NAME

BOOT SERVER

NBP DOWNLOAD REQUEST TO TFTP
PORT 69 OR MTFTP PORT
ASSIGNED IN BOOT SERVICE ACK

NBP DOWNLOAD TO CLIENT'S PORT

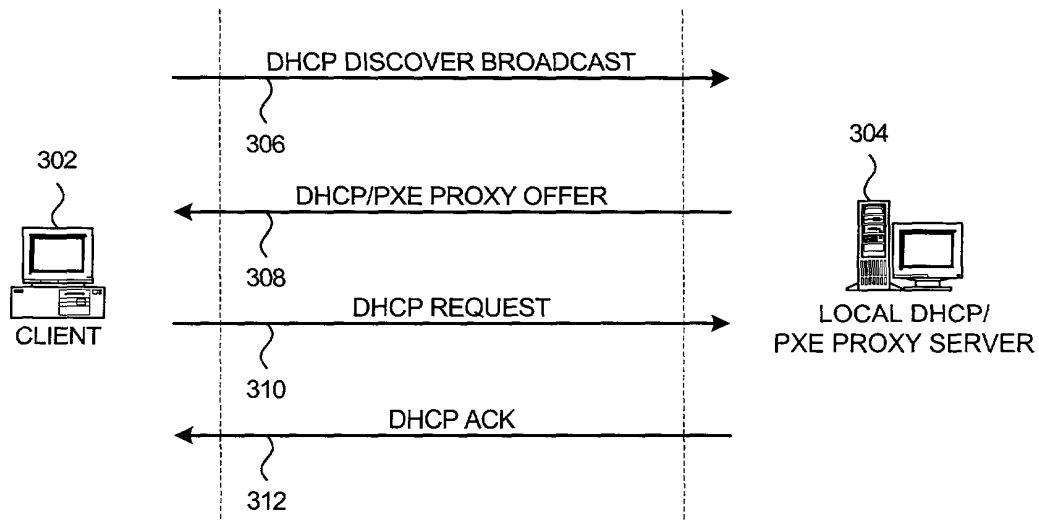M/TFTP SERVICE
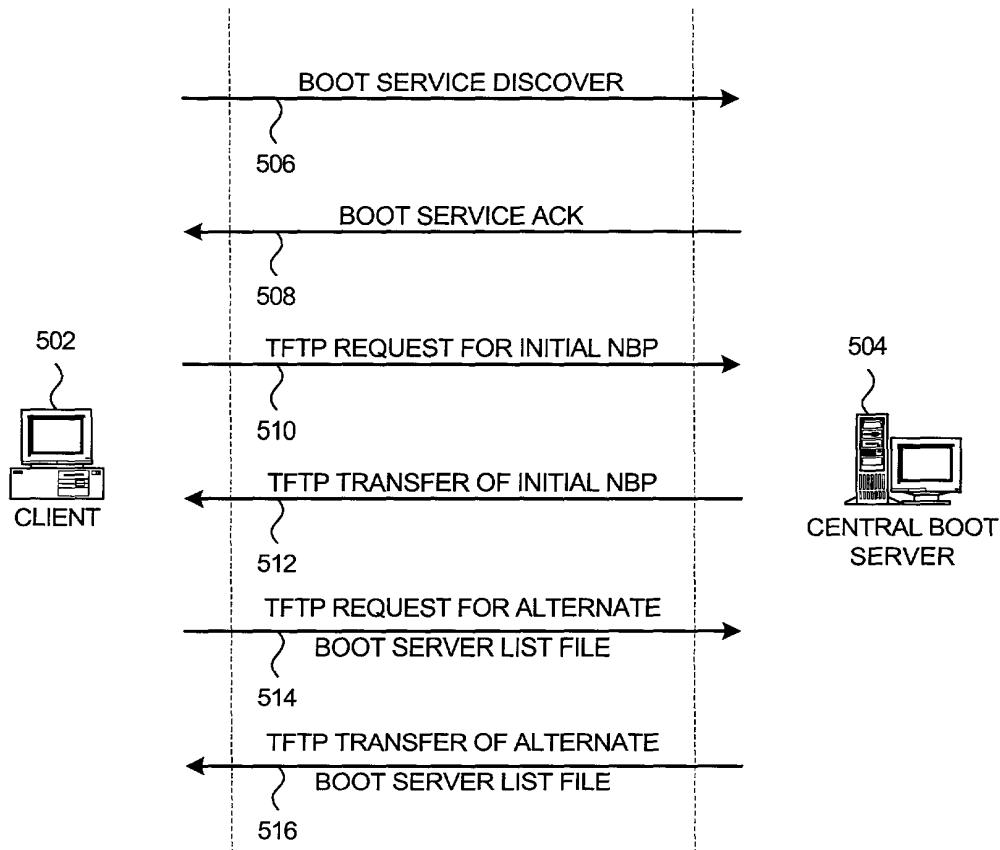
PXE CLIENT

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DHCP DISCOVER BROADCAST

306

302

DHCP/PXE PROXY OFFER

308

CLIENT

DHCP REQUEST

310

DHCP ACK

312

304

**LOCAL DHCP/
PXE PROXY SERVER**

FIG. 3

BOOT SERVICE DISCOVER

506

BOOT SERVICE ACK

508

502

TFTP REQUEST FOR INITIAL NBP

510

CLIENT

TFTP TRANSFER OF INITIAL NBP

512

504

**CENTRAL BOOT
SERVER**

TFTP REQUEST FOR ALTERNATE
BOOT SERVER LIST FILE

514

TFTP TRANSFER OF ALTERNATE
BOOT SERVER LIST FILE

516

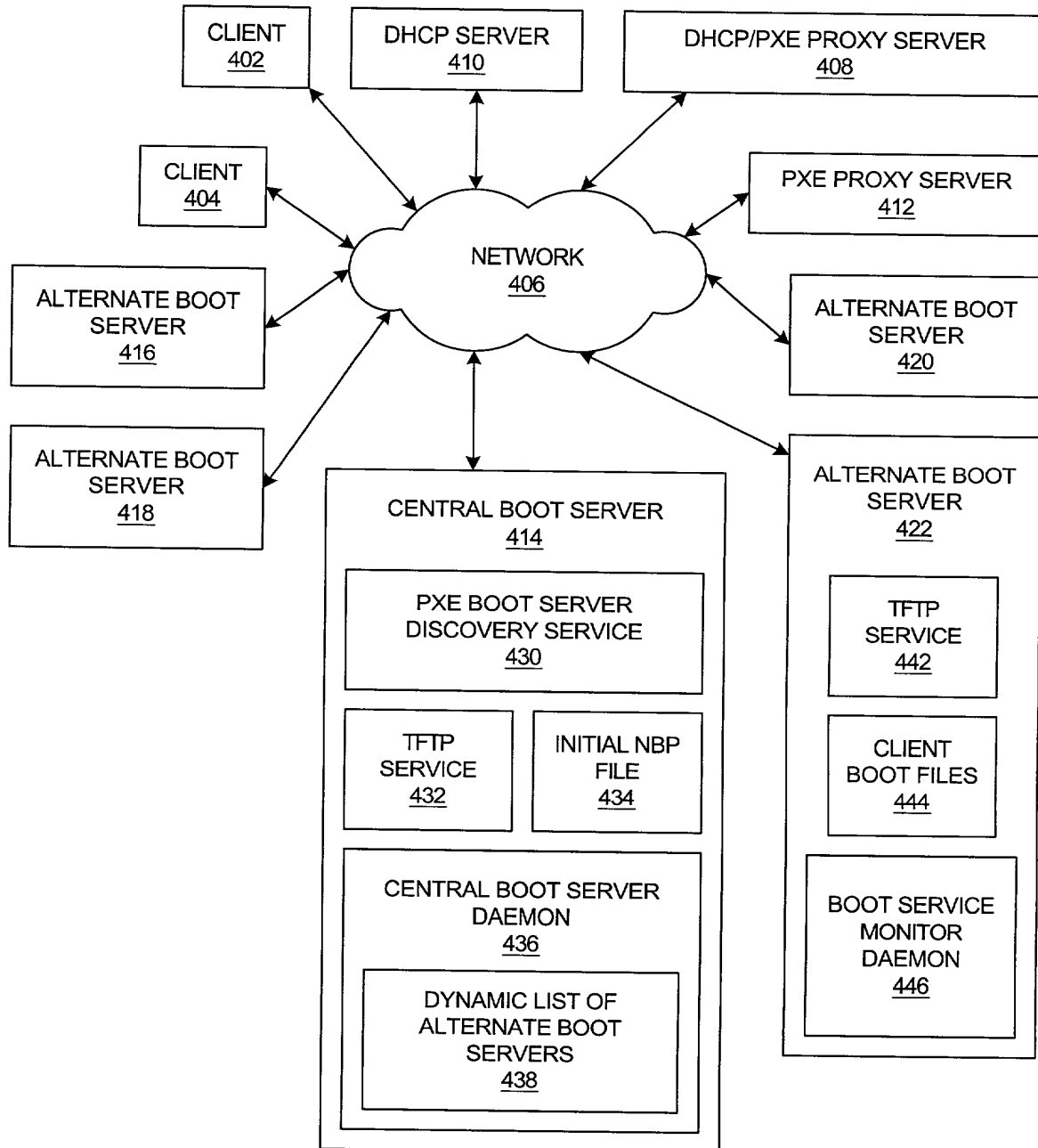*FIG. 5A*

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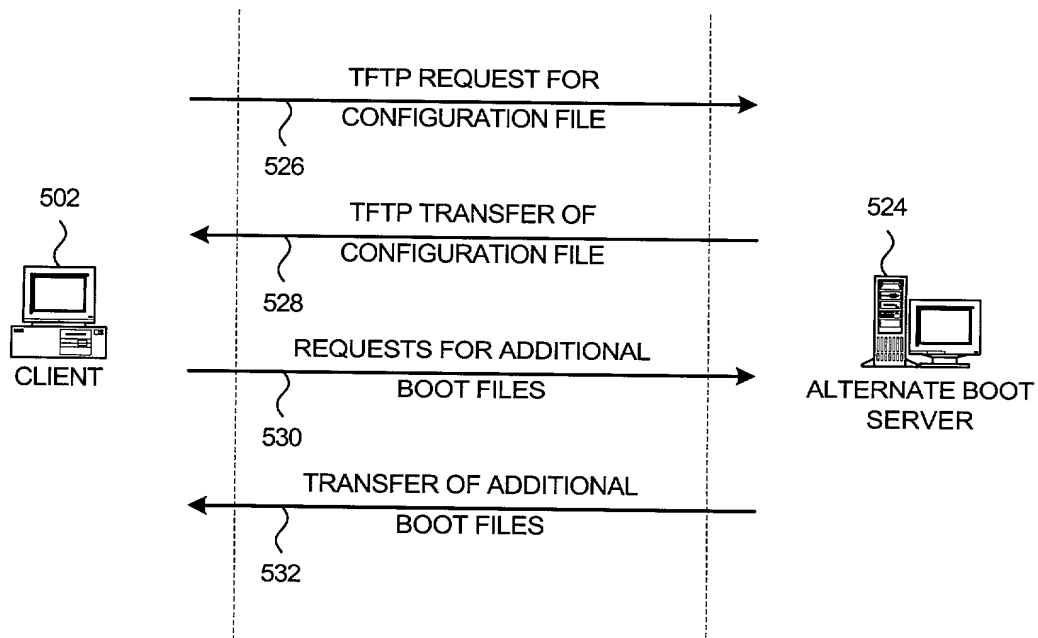**Method and system for dynamic redistribution of remote computer boot service**
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| CLIENT 402 | DHCP SERVER 410 | DHCP/PXE PROXY SERVER 408 |

CLIENT 404

PXE PROXY SERVER 412

NETWORK 406

ALTERNATE BOOT SERVER 416

ALTERNATE BOOT SERVER 420

ALTERNATE BOOT SERVER 418

ALTERNATE BOOT SERVER 422

TFTP SERVICE 442

CENTRAL BOOT SERVER 414

PXE BOOT SERVER DISCOVERY SERVICE 430

TFTP SERVICE 432

INITIAL NBP FILE 434

CLIENT BOOT FILES 444

CENTRAL BOOT SERVER DAEMON 436

DYNAMIC LIST OF ALTERNATE BOOT SERVERS 438

BOOT SERVICE MONITOR DAEMON 446
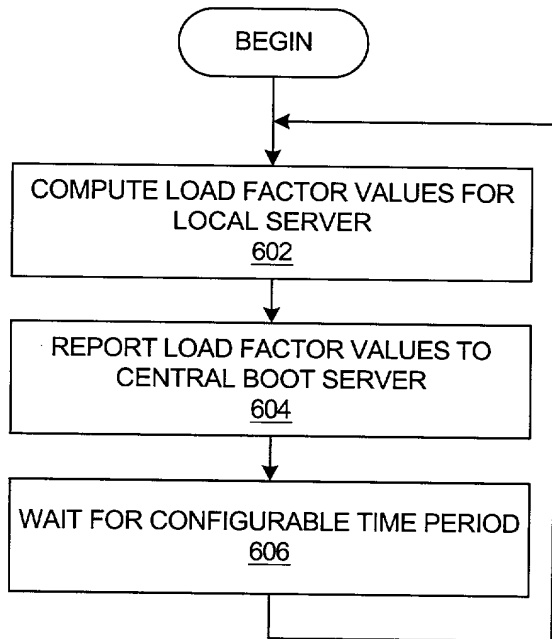
FIG. 4

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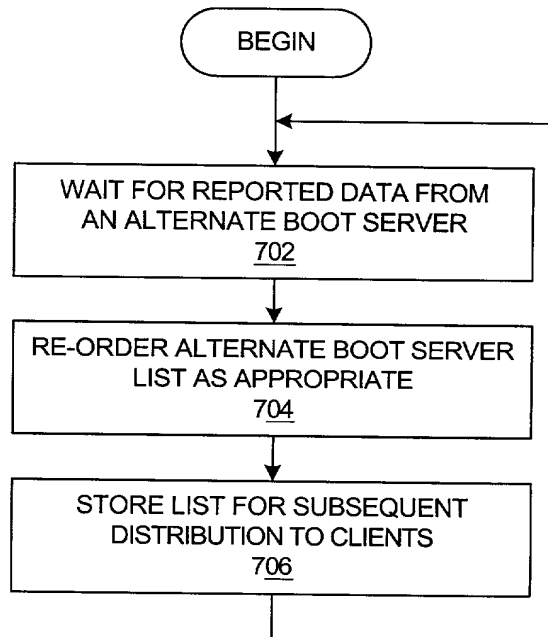**in a network containing multiple boot servers**

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502
CLIENT

524
ALTERNATE BOOT
SERVER

TFTP REQUEST FOR
CONFIGURATION FILE
526

TFTP TRANSFER OF
CONFIGURATION FILE
528

REQUESTS FOR ADDITIONAL
BOOT FILES
530

TRANSFER OF ADDITIONAL
BOOT FILES
532

FIG. 5B

BEGIN

COMPUTE LOAD FACTOR VALUES FOR
LOCAL SERVER
602

REPORT LOAD FACTOR VALUES TO
CENTRAL BOOT SERVER
604

WAIT FOR CONFIGURABLE TIME PERIOD
606

FIG. 6

BEGIN

WAIT FOR REPORTED DATA FROM
AN ALTERNATE BOOT SERVER
702

RE-ORDER ALTERNATE BOOT SERVER
LIST AS APPROPRIATE
704

STORE LIST FOR SUBSEQUENT
DISTRIBUTION TO CLIENTS
706

FIG. 7